

Progress Report for Proposal GC09-532: DEVELOPMENT OF SUBSEASONAL ENSEMBLE FORECAST TECHNIQUES

21 July 2010

Principal Investigator: **Siegfried Schubert** GMAO/GSFC/NASA

Co-Investigators: **Michele Rienecker**, GMAO/GSFC/NASA
Max Suarez, GMAO/GSFC/NASA
Yehui Chang, GEST/UMBC at GMAO/GSFC/NASA
Malaquías Peña, SAIC at EMC/NCEP/NOAA
Yuejian Zhu, EMC/NCEP/NOAA
Weiyu Yang, SAIC at EMC/NCEP/NOAA
Mark Iredell, EMC/NCEP/NOAA

1a. Results and Accomplishments at NASA/GMAO

While the nominal start date for the proposed work is 1 August 2009, we did not receive our funding until April of 2010, so our progress has been limited. We did (as part of our base-funding), produce a set of hindcasts with the GEOS-5 coupled model that will serve to benchmark our strategies for ensemble forecasting. The runs consist of 6 month hindcasts carried out every day for the period 1980-2009. An analysis was carried out to characterize the predictability and prediction skill of the MJO and how that varies by the phase and amplitude of the MJO. In a separate line of work, the breeding approach originally developed for seasonal forecasting, is now being adapted for the subseasonal problem.

We have had several meetings relevant to this proposal, one in October 2009 (including Steve Lord and Suru Saha) to discuss strategies for multi-model experimentation, and the need to having an ESMF and NEMS compatible version of MOM-4, a second (telecon in March of 2010) to discuss progress and next steps for the proposed work, and two more meetings in June (one telecon in and one at NCEP – see more information on that below) to make progress on the ESMF implementation of MOM4 at EMC.

1b. Results and Accomplishments at NOAA/EMC

We have agreed to use the most current version of the CFS to start the testing of ensemble generation strategies; the climate group at EMC will be eventually involved in this effort. The tasks of this project are addressed separately by two teams. The first team is in charge of developing an ESMF compatible coupled model at NCEP using the GEOS-5 coupled model as a prototype. Note that the operational NCEP GEFS runs under ESMF so this task is necessary to be able to implement this project's outcomes to operations. The second team is in charge of testing the ensemble generation methods with the most current NCEP CFS model. Max Suarez and Yuri Vikhliayev visited NCEP to

describe the main characteristics of NASA's coupled system and provided software to guide the first team at NCEP. The first team first updated the ESMF version to that from NASA. The first team is in the development stage to adapt needed libraries to NCEP supercomputer. The second team carried out "perfect model experiment" with an earlier version of the CFS. A 14 months simulation run, considered the nature run, was used as the background. The bred perturbations were grown upon the evolving background flow. Rescaling periods of 7 and 15 days were used. The rescaling metric was the SST in Nino 3 region. After the release of the new version of the CFS, the second team started the same type of experiments with this model.

2. PI Contact Information:

Siegfried Schubert
NASA/GFSC Code 610.1
Greenbelt, MD 20771
301-614-6145
siegfried.d.schubert@nasa.gov